

Selection Criteria Office Luminaires

Methodology

Topten.eu presents the most energy efficient luminaires for offices and other indoor use. The listed luminaires are certified by [MINERGIE®](#), a Swiss label most famously known for building standards. Each brand is represented with their most energy efficient model per category. The complete list of Minergie-certified luminaires can be found under www.toplicht.ch (website available in German).



Technical Criteria

The standards for Minergie-certified luminaires apply (detailed description in German [here](#)). The most important criteria are:

Typology

Only luminaires with LED light sources are accepted

Efficiency

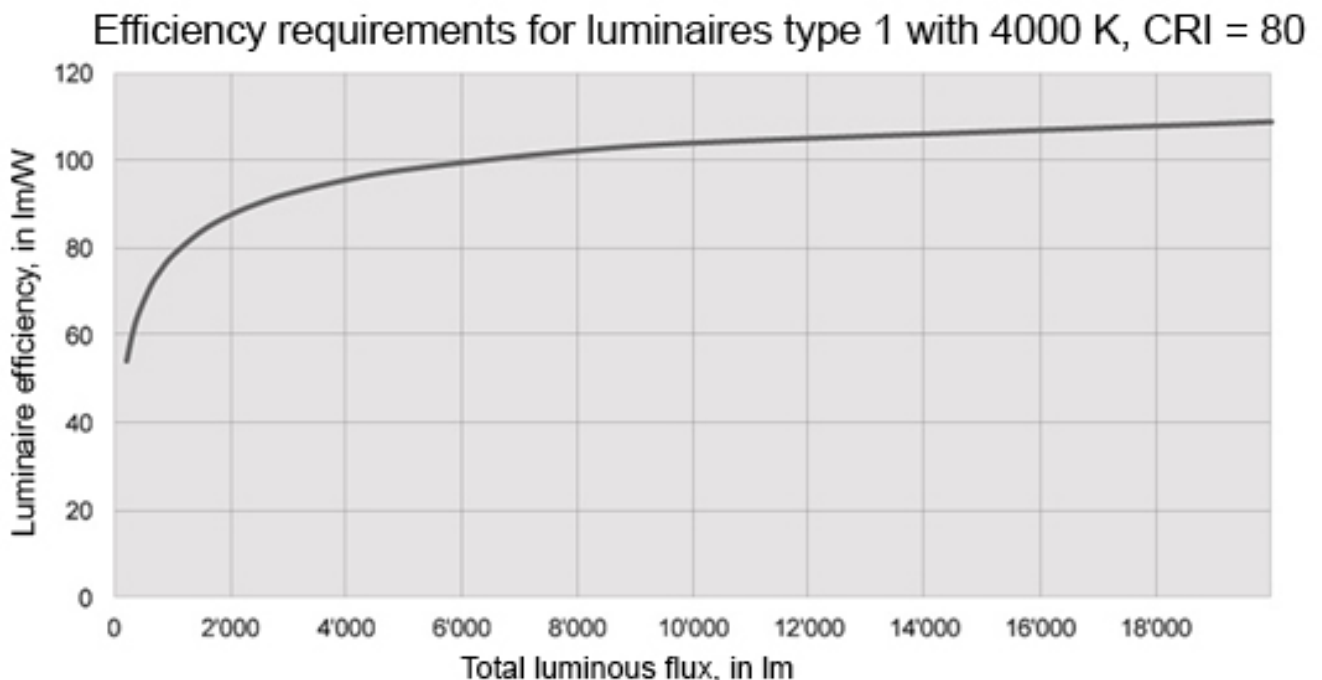
The efficiency requirement of office luminaires is based on the following Minergie formula:

$$\eta_{v,Lo} = \frac{\Phi_v \cdot 6 \cdot k_1 \cdot k_2 \cdot k_3}{0,88 \cdot \sqrt{\Phi_v} + 0,049 \cdot \Phi_v}$$

- $\eta_{v,Lo}$ Luminaire efficiency, in lm/W
- Φ_v Total luminous flux, in lm
- k_1 Correction factor luminaire type
- k_2 Correction factor colour temperature
- k_3 Correction factor colour rendering index (CRI)

The minimum efficiency requirements for the different luminaire types are listed in the [Annex of the Minergie Label Regulation](#).

In the figure below is a sample efficiency curve plotted for one luminaire type:



Power in standby mode

- Manual control (on/off), non-dimmable: 0 watts
- Dimmable ballasts: max. 0.5 watts

- Luminaires with presence/daylight control: max. 0.5 watts

(Based on the [Energy Star luminaires specification v2.1 2017](#))

Glare

Unified Glare Rating UGR in standard room according to MINERGIE: max. 25

Additional criteria

- Color rendering index CRI: min. 80
- Lamp life: min. 30'000 hours

Test laboratory

The test laboratory must be accredited by the responsible public authority

Data sources

Product information from Minergie / www.toplicht.ch.

Order of presentation

Models are ranked according to their luminaire efficiency factor in lumens per watt (lm/W); the higher the value the better. The order of presentation can be changed by clicking the tables' headings.

Glossary

Brand, Model

Brand with link to manufacturer website, name of model

Power

Measured value for power in watts (W)

Lamp category

Only luminaires with LED light sources are accepted

Options for lighting control

- Dimming: option available yes or no
- Presence / daylight sensor: option available yes or no

Downward flux

Percentage of downward flux (%)

- direct irradiation: more than 90% downward flux
- mixed direct/indirect irradiation: between 10 and 90% downward flux
- indirect irradiation: less than 10% downward flux

Luminaire efficiency factor

Ratio of the measured luminous flux of the luminaire (lumens) to the power (watts). The higher the value the better. The luminaire efficiency factor (lumens per watt, lm/W) corresponds to the product of the luminous efficacy of the light source (lm/W), the efficiency of the ballast (%) and the light output ratio of the luminaire (%).

Infoplus

Publications

- Eva Geilinger, Tobias Schleicher, Stefan Gasser, Eric Bush: [Office Luminaires: Voluntary labels can pave the way to the next level in energy saving](#). EEDAL 2013.
- (German) Fachbuch: [Licht im Haus - Energieeffiziente Beleuchtung](#). Herausgeberin: Fachhochschule Nordwestschweiz – Institut Energie am Bau. Autoren: Stefan Gasser, Daniel Tschudy. [Faktor Verlag](#), Zürich Dezember 2011. 180 Seiten, 250 Abbildungen und Tabellen.
- (German) [Schlussbericht LED-Pilot-Projekt VZ Werd](#) - Vergleich von zwei Beleuchtungsanlagen in zwei identischen Korridoren mit herkömmlicher Leuchtstofflampentechnik und mit LED-Technik und optimiertem Lichtmanagement. Im Auftrag der Stadt Zürich, Amt für Hochbauten. August 2011.

Standards and labels

- [MINERGIE@-Modul Leuchten](#) - Certification of luminaires with high energy efficiency, limited energy consumption in standby and limited glare. Complete list of Minergie-certified luminaires under www.toplicht.ch. Manufacturers can inquire about obtaining Minergie-certificates via the [contact form](#) on www.toplicht.ch.
- Energy Star [luminaires specification version 2.1](#) (2017)
- The european council for an energy efficient economy [eceee](#) provides a status overview on all products in the Ecodesign & Energy Labelling process.
- [Coolproducts](#) informs about the EU ecodesign process. It is a coalition of NGOs' campaign for a stronger, fast Ecodesign Directive to save the climate and money.